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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/733,585	12/10/2003	Joo-Haeng Lee	51876P431	8186

8791 7590 10/18/2005

BLAKELY SOKOLOFF TAYLOR & ZAFMAN
12400 WILSHIRE BOULEVARD
SEVENTH FLOOR
LOS ANGELES, CA 90025-1030

EXAMINER	
LAY, MICHELLE K	
ART UNIT	**PAPER NUMBER**
2672	

DATE MAILED: 10/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/733,585	LEE ET AL.	
	Examiner	Art Unit	
	Michelle K. Lay	2672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 September 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,13,19 and 23* is/are rejected.

7)☒ Claim(s) *4-12,14-18 and 20-22* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

The amendment filed on 30 September 2005, has been entered and made of record. The objection to claims 10 and 17 are withdrawn. Claims 1-23 are pending.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims **1**, **2**, **13**, **19**, **23**, are rejected under 35 U.S.C. 102(b) as being anticipated by Chen et al. (US Patent No. 5,613,048).

In regards to claims **1**, **23** –

Chen et al. describes a technique interpolation carried out through image morphing. A set of corresponding points or line segments within a pair or set of images is defined (claims **1**(a), **23**(a)) [column 4, lines 8 – 12]. An algorithm is then employed to determine the correspondence, or mapping, of the remaining points of the images. The correspondence mapping is then employed to interpolate the shape of each image toward the other (claims **1**(b), **23**(b)) [column 4, lines 12 – 14]. As shown in Fig. 4A, a pair of images are respectively labeled A and B. A pixel or a group of pixels is identified

in one of the images, and the location of the same pixel or group of pixels (claim **1**(c)) is determined in the second image (claim **1**(a), **23**(a)) [column 4, lines 17 – 23]. Pixel (20) in image A is located in image B at the position identified by (22). The displacement of the pixel (20) n going from image A to image B is used to form an offset map M_{ab}. The offset map is comprised of vectors, such as the vector (24), which identify the displacement of each pixel in going from the source image (A) to a destination image (B) [column 4, lines 27 – 30]. An interpolated offset map is determined for an intermediate viewing position that is located between the respective viewpoints for the images A and B. Referring to Fig. 4B, the product of the offset map M_{ab} and a coefficient t is computed to determine an interpolated offset map M_{at}. The coefficient t represents the location of the viewing position for which the interpolated map is computed [column 4, lines 31 – 37]. For example, the coefficient t can be the ratio of the distance between the intermediate viewing position and the viewing position for a source image A relative to the total distance between the viewing positions for the source image A and a destination image B, respectively (claims **1**(c), **23**(c)). Once the interpolated map M_{at} is determined, its vectors are applied to the pixels of the source image A, to result in an intermediate view T, as shown in Fig. 4C [column 4, lines 37 – 45]. Therefore, it would have been understood that this coefficient applies to a scaling factor so that the offset map determined by coefficient t allows for a mapping from one image (A) to the final image (B). Furthermore, Chen et al. teaches an option of the invention is to use "inverse mapping" (claim **1**(d), **23**(d)) [column 9, lines 60 – 61]. The inverse map from A to B indicates, for each pixel in image B, the coordinates of

corresponding pixels in image A. In using the inverse map, no holes occur, since every target pixel has a defined source pixel in the undeformed image [column 10, lines 4 – 8]. With reference to Fig. 2, the viewed scene is actually a two-dimensional image that is presented on a suitable display (14), such as a monitor for a computer system, a television set, or any other suitable display arrangement. The generation of the image is carried out under the control of a computer (16) (claim **23**) [column 3, lines 36- 40]. It would have been obvious to one in the art that the computer (16) would comprise a processor needing a readable recording medium to carry out the method of Chen et al.

In regards to claim **2** –

To view the scene from different perspectives, images adjacent to a viewpoint are interpolated to create the desired view. With this method, only a few key images are required, and interpolation is used to generate in between frames (claim **2**: determining the number of in-betweens) at interactive rates (claim **2**: speed controlling) [column 9, lines 31 – 35]. Furthermore, as stated in the rationale of claim **1**, a pixel or a group of pixels, is identified in one of the images, and the location of the same pixel or group of pixels is determined in the second image [column 4, lines 17 – 23]. The displacement of the pixel (20) n going from image A to image B is used to form an offset map M_{ab}. The offset map is comprised of vectors, such as the vector (24), which identify the displacement of each pixel in going from the source image (A) to a destination image (B) [column 4, lines 27 – 30]. An interpolated offset map is determined for an intermediate viewing position that is located between the respective viewpoints for the

images A and B. Referring to Fig. 4B, the product of the offset map M_{ab} and a coefficient t is computed to determine an interpolated offset map M_{at}. The coefficient t represents the location of the viewing position for which the interpolated map is computed [column 4, lines 31 – 37]. Therefore, it would have been understood that this coefficient applies to a scaling factor so that the offset map determined by coefficient t allows for a mapping from one image (A) to the final image (B) (claim **2**: group scaling).

In regards to claim **13** –

Chen et al. teaches for any two images, A and B, for which correspondences can be mapped, the forward map from A to B indicates where to move each pixel in A to arrive at a close approximation to image B [column 9, lines 60 – 68]. Any new location is specified for every source pixel in such a mapping, but it does not guarantee that all target image pixels will be covered with a pixel form the source image, and so "holes" may arise [column 10, lines 1 – 5]. The inverse map from A to B indicates, for each pixel in image B, the coordinates of corresponding pixels in image A. In using the inverse map, no holes occur, since every target pixel has a defined source pixel in the undeformed image [column 10, lines 5 – 10]. Thus, by taking the inverse of B would produce A with no holes and performing a forward mapping would result back to B, also with no holes since the source was originally B. This corresponds to the claimed equation:

$$DM(A) = DM(DM^{-1}(D)) = D$$

where as stated

$DM^{-1}(D) = A.$

Therefore, after substituting,

$DM(A) = DM(A) = D,$

reiterating that taking the inverse and then the forward will produce the original source image.

In regards to claim **19** –

In the example of Fig. 1, the movement of the virtual camera is one-dimensional, but may be multi-dimensional. The views of the teapot (10) can be taken from any point on the sphere that completely surrounds the teapot, rather than only a ring. An array of pre-stored images is determined for selected points on the sphere. These images can be connected to form a graph, where each node on the graph comprises a source image and each arc in the graph (connecting any two adjacent nodes) represents the correspondence mapping between the images [column 7, lines 29 – 41]. Therefore, this would allow the user to view the in-between images generated for morphing.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim **3** is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (US Patent No. 5,613,048). Chen et al. teaches the claimed limitations of claim **3** with the exception of disclosing changing a scale factor. However, Chen et al. teaches that the steps for the processing stage (i.e. inverse mapping and scaling) are repeated for each set of adjacent stored images [column 7, lines 11 – 12]. As stated in the rationale of claim **1**, the coefficient t would have been understood as a scaling factor so that the offset map determined by coefficient t allows for a mapping from one image (A) to the final image (B). Therefore, it would have been obvious to one in the art at the time the invention was made that the repetition of the processing steps includes determining the offset map, which corresponds to the coefficient t. This repetition aids in refining the mapping from one map to another. For example, by changing the scaling factor, the system has the ability and flexibility to morph from one aspect ratio to another.

Allowable Subject Matter

3. Claims **4 – 12**, **14 – 18**, **20 – 22** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments filed 30 September 2005 have been fully considered but they are not persuasive.

Applicant argues the prior art, Chen et al. (US Patent No. 5,613,048) does not teach or suggest the claimed step of extracting a direction map from each of the geometric shapes. However, Chen et al. defines a set of corresponding points or line segments within a pair or set of images [Chen et al.: col. 4, lines 8-12]. The use of a pair or set of images provides the ***direction map*** of one image so it can be morphed from the one image to the next within the pair or set. Therefore, the corresponding points or line segments pertains to the initial image that corresponds to the next image.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle K. Lay whose telephone number is (571) 272-7661. The examiner can normally be reached on Monday - Friday, 7:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi can be reached on (571) 272-7664. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michelle K. Lay
Patent Examiner
Art Unit 2672

10.11.2005 mkl

RICHARD HJERPE 10/13/05
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600